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10/586,035	12/19/2006	Adalbert Feltz	14219-119US1 P2004,0032 U	1777
26161	7590	10/29/2010	EXAMINER	
FISH & RICHARDSON P.C. (BO)			HOBAN, MATTHEW E	
P.O. BOX 1022				
MINNEAPOLIS, MN 55440-1022				
			ART UNIT	PAPER NUMBER
			1734	
			NOTIFICATION DATE	DELIVERY MODE
			10/29/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No. 10/586,035	Applicant(s) FELTZ ET AL.	
	Examiner Matthew E. Hoban	Art Unit 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 21-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/13/2006 12/19/2006 10/22/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of claims 1-20 and 24 in the reply filed on 8/17/2010 is acknowledged. The traversal is on the ground(s) that the inventions all comprise the same special technical feature. This is not found persuasive because the express statements in the requirement for restriction establishes that the subject matter of the invention does not contain a special technical feature. Thereafter, the claims cannot contain a corresponding special technical feature, as this feature is not present in the claims as presented.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 21-23 and 25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 8/17/2004.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-17 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are indefinite as they tend to

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describe a singular ceramic material, which can be described as a solid solution as a ceramic comprising multiple different ceramic subcomponents individually. In the art of solid solutions of a perovskite nature it is conventional in the art to describe a solid solution by those subcomponents to which it would relate. In the simplest scenario a solid solution of PZT can be described as $x(\text{PbZrO}_3)_{1-x}(\text{PbTiO}_3)$; however the lead titanate and lead zirconate in the solid solution are not identifiable as individual ceramics. Thereafter describing PZT as a ceramic having a formula represented by the above is appropriate, but describing the solid solution as a ceramic comprising both PZ and PT is not, since the ceramic material does not necessarily contain PZ and PT phases, but a solid solution of the 2. Thereafter, it is likewise inappropriate to describe the instantly claimed ceramic as such. It is understood that applicant chooses to use the language to describe the occupancy of the B site with an element such as Sr or Ca, but it is believed that the formula as seen in claim 18 is more appropriate as it shows that the ceramic is a solid solution of several components rather than individual PZT and a cryolite phases. For these reason it is unclear as to what is being claimed.

Claim Objections

5. Claim 3 is objected to because of the following informalities: The claim contains the variable "Br" in the formula. This should simply be "B". Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 6, 9, 11, 13, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Ushida in EP 0344978.

Regarding Claim 1-2: Ushida teaches a ceramic composition of the formula $Pb_{1-a}M_a(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$,

wherein a is between 0 and 0.1, x is from 0.05-0.7, y is from 0.25 to 0.5 and z is from 0.05 to 0.7 and M is chosen Sr and Ba. Other oxide components comprise the mixed oxide and can be seen in for example on page 3 of the document. Thereafter this composition could be considered a solid solution (mixed crystal) of PZT-PMN and $M(Mg_{1/3}Nb_{2/3})O_3$, which is structurally and chemically the same as the composition claimed as a cryolite component $M_4(Mg_{4/3}Nb_{8/3})O_{12}$, where x=1 as the A and B site occupancy is the same in both compositions.

Regarding Claim 6 and 9: Ushida teaches a solid solution (mixed crystal) of PZT-PMN and $M(Mg_{1/3}Nb_{2/3})O_3$ (M= Sr or Ba), which is structurally and chemically the same as the composition claimed as a cryolite component $M_4(Mg_{4/3}Nb_{8/3})O_{12}$, where x of the instant claims is equal to 1.

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Regarding Claim 11, 13: Ushida teaches a solid solution (mixed crystal) of PZT-PMN and $M(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$, wherein PMN is an additional component having a perovskite lattice-type structure.

Regarding Claim 24: The structure of Ushida is free of Potassium and thus must also be free of potassium niobate.

8. Claims 18-20 rejected under 35 U.S.C. 102(b) as being anticipated by Garg in his publication entitled "Effect of net PbO content on mechanical and electromechanical properties of lead zirconate titanate ceramics".

Regarding Claim 18-20: Garg teaches a composition of $\text{P}_{1+x}(\text{Z}_{0.535}\text{Ti}_{0.465})\text{O}_3$, where x is varied from -1.7E-2 and +1.8E-2 (See Table 1). This composition does not contain Potassium, Niobium, or a compound of the two.

Claim Rejections - 35 USC § 103

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida in EP 0344978.

Please review the above 102 rejection over Ushida.

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Ushida teaches a ternary ferroelectric composition including PZT. The composition is of the formula $\text{Pb}_{1-a}\text{M}_a(\text{Mg}_{1/3}\text{Nb}_{2/3})_x\text{Ti}_y\text{Zr}_z\text{O}_3$, wherein a is between 0 and 0.1, x is from 0.05-0.7, y is from 0.25 to 0.5 and z is from 0.05 to 0.7 and M is chosen Sr and Ba. As the only major component including Titanium and Zirconium in the solid solution is PZT, the ratio of Zr to Ti in this portion would be relative to the amounts of Ti and Zr added to the solid solution. As this range includes a situation where the amounts of Ti and Zr are roughly equal to that of where Zr is in slight excess of Ti, it is deemed that the range taught by Ushida would represent an overlapping range with the composition as claimed. Overlapping ranges have been held to establish a prima facie case of obviousness over the prior art. One of ordinary skill in the art would only need to select a composition from the overlapping portion of the range to arrive at the invention as claimed. See MPEP 2144.05.

10. Claims 11 and 14-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida in EP 0344978 as applied to claims 1 and 11 above, and further in view of Salto in 2003/0174553.

Ushida teaches a ferroelectric ceramic of the composition $\text{Pb}_{1-a}\text{M}_a(\text{Mg}_{1/3}\text{Nb}_{2/3})_x\text{Ti}_y\text{Zr}_z\text{O}_3$, wherein a is between 0 and 0.1, x is from 0.05-0.7, y is from 0.25 to 0.5 and z is from

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0.05 to 0.7 and M is chosen Sr and Ba. Ushida does not teach the addition of certain additives seen in claims 14-17.

However, Salto teaches that the addition of perovskites such as those claimed are conventional in the art of creating a ferroelectric material especially tailored to be incorporated into a semiconductor memory device. Specifically Salto teaches that conventional additives within the art are as follows $\text{Pb}(\text{B}_{1/3} \text{B}_{2/3})\text{O}_3$, $\text{Pb}(\text{B}_{1/2} \text{B}_{1/2})\text{O}_3$, $\text{Pb}(\text{B}_{1/4} \text{B}_{3/4})\text{O}_3$, wherein the summation of B components are chosen to have a total valency of +4 and chosen from Li, Cu, Mg, Ni, Zn, Mn, Co, Sn, Fe, Cd, Cu, Sb, Al, Yb, In, Fe, Co, Sc, Y, Sn, Nb, Ta, Bi, W, Te and Re. Thereafter, Salto expressly discloses the use of at least those additives claimed instantly in claims 14-16. In terms of the additives taught in instant claim 17, the use of a combination of components including both Li and one of Nb, Ta, or Sb would necessarily have the same effect on the final composition as the object of the invention is a mixed crystal of the components and not to a ceramic having the original components intact. This situation is also the case for KNbO_3 as K is shown to be a possible dopant on the A site, thereafter the final composition could be described as incorporating potassium niobate dopants when such elements are added to the A site of the perovskite. Thereafter, it would have been obvious to add any of the above components to the ferroelectric composition of Ushida. One of ordinary skill in the art would find that this was obvious based on their conventional nature and would be motivated to add said components based on the fact that Salto teaches that the addition of said components can effectively provide a thin

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film of ferroelectric material having superior dielectric characteristics (See Paragraph 235 of Salto).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 10 AM to 6:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily M. Le can be reached on 5712720903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew E Hoban/
Examiner, Art Unit 1734

/EMILY M LE/
Supervisory Patent Examiner, Art
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